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ABSTRACT

The possibility that industrial nations will become "global villages" or comprise a "wired world" with a common information system appears possible in light of technology, but there are five major reasons why such an information society will not occur for some decades, particularly in the United States. The reasons are as follows: (1) there is no communication policy at the national level, (2) media ownership is diverse, (3) most innovative communication technology is beyond the financial reach of the majority of families, (4) there is a lack of public interest in technology beyond cable television and video recording systems, and (5) sophisticated information systems are very costly to build for media corporations. Rather than achieving a global village, societies will be inundated with a wide assortment of information systems. This assortment will, in effect, stratify societies into ten levels of information systems, creating information inequity parallel to economic levels. These ten levels range from the telephone, radio, television, and newspaper level (into which the majority of families fall) through cable television and video recording systems, to the most sophisticated and costly system that includes a personal computer and computer-conference hook-up to outside data banks. (HTH)

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TRANSITION TO THE WIRED WORLD: A MODEL FOR THE STUDY OF POTENTIAL SIDE-EFFECTS OF INFORMATION INEQUITY

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TRANSITION TO THE WIRED WORLD:
A MODEL FOR THE STUDY
OF POTENTIAL SIDE-EFFECTS OF INFORMATION INEQUITY

Two areas have recently emerged which are currently occupying mass communication researchers concerned with new communications technology and the information society. Researchers in the first area argue that members of an information society may suffer from such problems as: information overload,[1] invasion of privacy,[2] and psychological isolation.[3] Simultaneously, researchers in the second area are arguing that members of non-information societies will suffer from a lack of information.[4] We have no argument with either view.[5]

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[1] Dennis Gabor, "Social Control Through Communications," in Communications Technology and Social Policy: Understanding the New "Cultural Revolution," ed. George Gerbner, Larry P. Gross, and William H. Melody (New York: John Wiley & Sons, 1973), pp. 83-93.; Lewis Branscomb, "Future Computer: The Shock Will Be Extra Ordinary--And One Hopes, Benevolent," Across the Board, (March 1979), pp. 61-68.

[2] Henry Geller and Stuart Brotman, "Electronic Alternatives to Postal Service," in Communications for Tomorrow: Policy Perspectives for the 1980s, ed. Glen O. Robinson (New York: Praeger Publishers, 1978), pp. 307-349; Anthony G. Oettinger, "Information Resources: Knowledge and Power in the 21st Century," Science, 209, No. 4 (1980), pp. 191-198; Dennis Gabor, pp. 83-93; Charles Ferris quoted in A.H. Raskin, "Is This the Newspaper of the Future?" Lewiston Morning Tribune, 3 Aug. 1980, Sec. E., pp. 1-2.

[3] Alphons Silbermann, "Communication Systems and Future Behavior Patterns," International Social Science Journal, 29, No. 2 (1977), pp. 337-341; and Ben Bagdikian, "How Communications May Shape Our Future Environment," in Mass Media: Forces in Our Society, ed. Francis Voelker and Ludmila Voelker (New York: Harcourt Brace Jovanovich, 1972), pp. 11-18.

[4] See Anthony Smith, The Geopolitics of Information (New York: Oxford University Press, 1980), and Herbert Schiller, "Computer Systems: Power for Whom and for What?" Journal of Communications. 28, No. 4 (1978), pp. 184-193;

Our intention in this paper is to demonstrate that certain groups 'within' information societies will 'also' suffer side-effects due to information inequity. We contend that post-industrial societies will be stratified by multiple information systems rather than a single system. More efficient, productive and effective information systems will go to the more affluent families, those families tied into large corporations, and those engaged in research.

Literature on information inequity within an information society is almost nonexistent. This is due, we believe, to a misunderstanding of what the future portends. The widespread use of the terms wired world, global village, and more recently, information society, has resulted in the mistaken view that post-industrial societies are rapidly moving toward a communication utopia.

The term 'global village', for example, was used by the late Marshall McLuhan[6] to describe the way in which the electronic media would eventually homogenize the various societies of the world into a common social network. McLuhan argued that we are present everywhere in the world simultaneously by virtue of our ever present ability to communicate anywhere at any time through our electronic media.

Almost simultaneous with McLuhan's rhetoric came the optimistic predictions of a wired world. In 1971 U.S. News and World Report published a book entitled Wiring the World: the Explosion in Communications which may have served as a catalyst for the popular use of the term 'wired world'. According to the authors:

> We will become a 'wired nation,' pioneer of a 'wired world.' Over-the-air television broadcast will be supplanted in large part by 'broadband' networks bringing unlimited programming as well as two-way communication into our homes and offices.[7]

A more recent phrase which has replaced 'the wired world' for communication scholars and sociologists, is the 'information society.'[8] Information

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Ronald S. Homet, Jr., Politics, Cultures, and Communication, (New York: Praeger Publishers, 1979); and Marc U. Porat, "Communication Policy in an Information Society," in Communications for Tomorrow: Policy Perspectives for the 1980s. ed. Glen O. Robinson (New York: Praeger Publishers, 1978), pp. 3-60.

[5] Researchers concerned with the lack of information are primarily referring to the Third World.

[6] Marshall McLuhan, Understanding Media, (New York: McGraw-Hill Book Company, 1964), p.348.

[7] Joseph Newman, ed., Wiring the World: the Explosion in Communications (Washington, D.C.: U.S. News and World Report, 1971), p. 17.

[8] See for example the Winter issue of the Journal of Communication (1981) which was devoted to the concept of an information society.

societies are defined as societies in which more than 50% of the work force is involved in the transfer of information as opposed to being involved in consumer industries.[9] The United States, for example, qualifies due to the large telephone, telecommunications and computer industries involved in producing, distributing, storing and retrieving information.[10]

The term, information society, is less than succinct but is a very apt description of the socio-economic situation in post-industrial societies and, to some extent, describes the importance of information as a consumer item. Unfortunately, the term also suggests the presence of communication networks which do not exist and, as we argue here, probably will only evolve in a piecemeal fashion during the next thirty years.

Notions of a wired world often lead to notions of communication utopias as can be seen in Arthur Clarke's prediction that communications satellites may mean the end of the city as we now know it. "Megapolis may soon go the way of the dinosaurs it now resembles in so many respects."[11] Hiltz and Turoff have similar visions: "The overall effect [of computer conferencing], we predict, will be to hasten the transformation of the social structure to what we term the 'Network Nation."[12]

On the surface, the prospects for a wired nation in post-industrial societies would seem promising. Corporations and common carriers, such as Xerox AT&T, Bell, IBM, Comsat et al, have the knowledge and the resources, and the FCC could provide the regulations. Programming could come from the three commercial networks, PBS, pay cable and the film industry. Teletext information could be handled by CBS who has already asked for permission to set up a teletext system.[13] As for public receptiveness, Turner's 24 hour cable news network and the voracious appetite of the public for pay-TV has shown that at least a segment of the public is eager for more information.

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[9] Parker, Edwin and Marc Porat, "Social Implications of Computer/Telecommunications Systems," Paper prepared for presentation at the Conference on Computer/Telecommunications Policies, Feb. 1975 Paris, France. 64p. ERIC ED 102 978; Marc Uri Porat, "Global Implications of the Information Society," Journal of Communication (Winter 1978), pp. 70-79.

[10] See the Winter 1981 issue of the Journal of Communication, 31, No. 1 (1981).

[11] Arthur C. Clarke, "Prediction, Realization and Forecast," in Communication in the Space Age: the Use of Satellites by the Mass Media (Amsterdam, Netherlands: UNESCO, 1968), p. 38.

[12] Starr Roxanne Hiltz and Murray Turoff, The Network Nation: Human Communication via Computer (Readings, Mass: Addison-Wesley, 1978), pp. xxvi, xxvii.

[13] "CBS Going Live with Teletext in L.A. Test," Broadcasting, 17 Nov. 1980, p. 21.

Unfortunately, there are numerous reasons why we will not see a wired nation here in the U.S. for several decades. First, and most importantly, there is no plan at the national level. Bushkin and Yurow, of the National Telecommunications and Information Administration, for example, have noted: "In the United States, as in other countries, there is no one grand information policy, no single national information policy, but rather a composite of policies, explicit and implicit, about information."[14] The chances of a new telecommunications policy emerging in the near future seem slim indeed. The beauracratic hindrances to introducing and passing new policies can be seen by Rep. Van Deerlin's attempt to rewrite the Communications Act of 1934. After several years of work the plan was abandoned in July of 1979. Government policy making is done by one of three organizations: the Federal Communications Commission, the National Telecommunication and Information Administration of the Department of Commerce and the Department of State. All of these organizations are in some way subject to policies emanating from the White House, the ITU and other international organizations. As for the FCC, Cole and Oettinger have commented: "Planning has never been one of the FCC's strong suits."[15] In the U.S., regulations are not centralized and policy is influenced by special interest groups. Hubert Schlafly has aptly summarized the failure of the U.S. to become a 'wired nation':

> We are an unwired nation largely because regulatory precedent and other defensive and offensive measures continue to be skillfully employed by a number of established services.[16]

More recently, Timothy Wirth, chairman of the House Telecommunications Subcommittee sarcastically remarked; its "next to impossible to get Congress to act on complex, controversial ideas without an informed national constituency clamoring for action, without problems which obviously call for immediate solutions, and with a cautious set of industry advocates whose self interest is in a state of flux."[17] As long as the U.S. policy making process in communications remains pluralistic, a single comprehensive plan is not likely to emerge.

The consequences of a lack of governmental plan will be to hinder development of a wired nation. The first wired nation would likely be Japan or a Western European country due to their policy making process. R. Homet, for

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[14] Arthur A. Bushkin and Jane H. Yurow, "The Foundations of United States Information Policy," Special Publications (Washington, D.C.: Department of Commerce, National Telecommunications and Information Administration, 1980), p. 4.

[15] Barry Cole and Mal Oettinger, Reluctant Regulators: The FCC and the Broadcast Audience (Menlo Park, CA: Addison-Wesley Publishing, 1978), p. 13.

[16] Hubert J. Schlafly, "A Review of the Unwired Nation," paper presented at the Telecommunications Policy Research Conference, 21-24 April 1976, Airlie, Virginia, p. 2. ERIC ED 122 771.

[17] "Infotel '81 Conference Looks at the Future of Communications," Broadcasting (9 Feb. 1981), p. 32.

example, reminds us that in Western Europe "anything that relates immediately to the provision of public point-to-point message service falls as a general matter under monopoly control."[18] State control of telecommunications will work to the advantage of countries attempting to design a wired information system. Homet goes on to note that "In West Germany and in Britain, the press has stepped forward to claim a right of control over the new technology."[19] It is likely then, that Japan or a Western European nation may serve as the prototype for a wired nation. Should this happen it may serve to encourage the U.S. to ingender a comprehensive telecommunication plan.

When such a comprehensive plan does occur in the United States, it can be expected that the telephone and computer networks will be the first to integrate to form the basic "wiring." Corporations such as the Network Analysis Corporation (NAC) already serve as consultants in "planning, analysis, design, testing, monitoring, and utilization of computer and communication networks and network-like systems"[20] for large corporations, government, military, and large agencies. Experience with such a wide range of organizations will undoubtedly put them, an existing common carrier, e.g., AT&T, or a large conglomorate such as IBM or Zerox in the center of any comprehensive plan for a national telecommunications network. Once these large organizations, which have the research facilities and the economic means, set up the basic network, plans for integrating public use of computer time and data banks and integration of interactive cable could be implimented.

Related to the absence of a national telecommunications plan is the present composition of media ownership. When AT&T was formed it was allowed to monopolize the telephone industry because no one could imagine the present day mass communications industry. As we enter the 80's, the situation is considerably different due to public cognizance of the effects of the communication industry on politics, economics, culture and on public opinion. As Benjamin Compaine has explained in the introduction to his study of media ownership: "The mass communications industry is unique in the American private enterprise system, because it deals in the particulary sensitive commodity of ideas, information, thought and opinion."[21] The outcome of this awareness is simply that government regulators are rightly or wrongly reluctant to authorize a single company, such as AT&T, to implement a national network involving both telecommunications and computer communications. As an example, the Justice Department has only just reached an agreement with AT&T concerning their most recent antitrust suit.

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[18] Homet, p. 15.

[19] Homet, p. 34.

[20] Network Analysis Corporation, Activities in Computers and Communications (Great Neck, New York: Network Analysis Corporation, 1978), p. 1.

[21] Benjamin M. Compaine, Who Owns The Media? Concentration of Ownership in the Mass Communications Industry, (New York: Harmony Books, 1979), p. 1.

The information industry as it now stands is primarily owned and distributed by a small number of corporations and conglomorates. This has led to paranoia concerning the trajectory of media ownership, and information flow, and this paranoia has served as an impediment to effective government planning. Compaine has perceptively warned:

> Given the vast array of separate entities with holdings in the mass communications industry, policy makers must avoid accepting at face value some assumed myths, such as that greater diversity yields higher quality.[22]

While it is clear that the production of programming content should not be limited to a narrow group of producers as has been the case in network television--it is equally clear that the same philosophy, when applied to telecommunications, will result in a needless proliferation of overlapping systems. James Martin has cited the following arguments against an overemphasis on competition in the field of telecommunications: (a) economies of scale give the advantage to large common carriers, (b) duplication of facilities imposes on the radio spectrum, which is already a scarce natural resource, (c) competing systems are wasteful and (d) are expensive for the consumer.[23]

In the area of regulating business communications the government seems recently to have had a change of heart. Last Spring (1980) the FCC adopted Computer Inquiry II, which will, in effect, allow AT&T to enter the hybrid data processing market. The economic implications of Computer Inquiry II could be profound since data processing will not be subject to the FCC (though pure communications will continue to be regulated as a basic common carrier service). This will make a difference in the business world. However, the effect on information systems at the level of the family should be minimal.

A third problem has to do with 'discretionary income' (that which is beyond what is required for basic needs). Families already differ in how much of their discretionary income is spent on information. Most of the new technologies require expensive hardware and software. Families will need to be convinced that telecommunications hardware ought to be considered a necessity rather than an additional form of entertainment. Video tape recorders, video discs, terminals and printers will come down in price but will likely remain too expensive for the majority of families even in the most affluent societies. In addition to the cost of hardware and software, families will need to contend with the increasing cost of subscription and of running and maintaining these systems. The monetarily poor will thus become the information poor.

A fourth problem is lack of public interest. While virtually every household in the U.S. has a television, the receptiveness to more advanced telecommunications systems, such as cable TV, gives us an indication of how fast these systems are integrated into society. By most estimates less than 40 million households will have cable TV by 1985. When we consider that

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[22] Campaine, p. 337.

[23] James Martin, Future Developments in Telecommunications (Englewood, Ca: Prentice-Hall, Inc., 1977), pp. 356-357.

interactive cable is a newer system than cable, it can be seen that the percentage of families who will have interactive cable by the year 2000 will be relatively small.

Innovations are always adopted differentially by the members of a social system. The lack of public interest among some segments of the society raises questions for the researcher of new communication technology: Who will adopt and use the new technologies? Who will resist? What characteristics will tend to distinguish those families eager to learn the skills and acquire the necessary hardware and software in their homes from those who decline such innovations? It is not our purpose here to explore these questions. But we do wish to stress that differential acceptance of the new technologies will perpetuate the presence of multiple levels of information systems within families long after one might otherwise expect the presence of one information system in the homes.

Rogers and Shoemaker identify five categories of innovation adopters:[24] Innovators, Early Adopters, Early Majority, Late Majority, and Laggards. These categories relate to the relative quickness with which individuals adopt new innovations as compared to fellow members of their social group. They have correlated various characteristics within each adopter category.[25] For example, those who adopt early tend to be younger and more affluent.[26] A comparison of the demands made on the individual by different information systems with the characteristics of adopter types may help researchers identify those families most likely to adopt the higher levels of information systems. It may be that innovators and especially early adopters will dominate the more sophisticated, computer-oriented systems while the early majority and the late majority may be satisfied with entertainment-oriented information systems.

As Rogers and Shoemaker point out, change agents can generally predict the form and sometimes the function an innovation will take on in a particular social system but "seldom are change agents able to predict another aspect of an innovation's consequences, its meaning, the subjective perception of the innovation by the clients."[27] The issue of public interest will be strongly

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[24] Everett Rogers and Floyd Shoemaker, Communication of Innovation, 2nd edition (New York: The Free Press, 1971).

[25] Innovator: eager to try new ideas; has the economic means to cover any financial risk involved and the learning ability to understand technical aspects of the innovation. Early adopters: invests more time varifying the value of the new ideas before adopting; generally a leader in the social system whose opinion is asked by other potential adopters. Early majority: waits for others to evaluate the system then seeks their opinion before adopting; followers rather than leaders. Late majority: waits for others to try out the new ideas so can see the utility of the innovation; tend to follow out of peer pressure. Laggards: measure new ideas against the past traditions rather than in and of themselves; suspicious of new ideas; has only local perspective of the world. (Everett Rogers, Diffusion of Innovations (New York: The Free Press of Glencoe, 1962).

[26] Rogers, 1962:172-178.

affected by subjective perception of the innovation.

One factor which may lower public interest is the lack of skill. Research on individual use of videotext systems by D.S. Abrahamson and R.P. Murray has shown that:

> . . . a few individuals reported no interest [in using video-text systems.] This lack of interest was correlated with an increased number of task responses and a view of obtaining information from a computer as less than completely pleasant."[28]

The authors conclude that the necessary interaction skills may be developed after extended use, but they warn: "It is certainly important to know whether early interest and interaction are maintained if initial videotex offerings are succeeded."[29]

Since Columbus, Ohio is the closest thing to a 'wired city' in the U.S., (due to Qube), we might consider the situation there. Thus far, Qube has signed up less than 30,000 families out of a potential of over 100,000, despite the fact that they purposely located in an affluent area.[30] Edward Meadows, in an article on Qube for Fortune magazine has put it well in his review of new home information systems:

> Many of the information services from home-computer programs to the pages of an encyclopedia displayed on video-seem designed to satisfy the needs of the 'knowledge workers' who would populate the 'information economy' that some futurists see coming. But until it arrives, the breath for all these data is questionable.[31]

The potential use of viewdata or videotext systems, offered by Qube and Project Ida, remain unknown due to the complex variables involved. Pelton has suggested that any rapid growth may be inhibited by the fact that these systems "require much more sophistication on the part of the user than do teletext systems."[32] According to the results of Pelton's survey, based on the

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[27] Rogers and Shoemaker, 1971:18.

[28] D.S. Abrahamson and R.P. Murray, Human Factors Study: Experiments 1, Keyboard Type & System Response Delay, report to Manitoba Telephone System, 1980, p. 14.

[29] Abrahamson and Murray, p. 18.

[30] Recall also that even the basic TV set, though introduced in 1950, did not become a common item in every household until 1965.

[31] Edward Meadows, "Why TV Sets Do More in Columbus, Ohio," Fortune (6 Oct 1980), p. 73.

[32] Joseph Pelton, "The Future of Telecommunications: A Delphi Survey," Journal of Communications, 31, No. 1 (Winter 1981), pp. 177-189.

Delphi technique of forecasting, viewdata systems may be used by as few as 5 to 10 percent of the homes in the O.E.C.D. countries by 1985 to 2000. The percentage of users, it is suggested here, will be somewhat higher here in the U.S., due to the rapid growth of Qube and similar systems presently emerging.

A fifth reason why sophisticated information systems will not develop nationally in the near future is the cost of building these systems. Regarding costs, Robert LaBlanc, vice-chairman of Continental Telephone, stresses that equipment for new systems "must be connected together by communications services....Systems will be replaced one at a time as cost savings or improved productivity can cost-justify their replacement."[33]

Fiber optics offer an example regarding the pace of development of emerging technology. In order for every individual in an information society to have a two-way TV and computer connection all homes would have to be tied into the sub-center and the center itself through a fiber optics system, a coaxial cable system, a microwave system, or a satellite system.

At the present time it seems unlikely that fiber optics will replace existing lines in the United States within the near future. Bell Labs continues to experiment with fiber optic systems but is a long way from mass installation. This last year, two Bell Labs researchers were granted a patent for yet another glass fiber system.[34] Clearly, Bell has plans for a nationwide network but thus far they have only completed experimental projects in parts of Sacramento, Lake Placid, Manhattan, Chicago and Atlanta. Only in Atlanta does Bell have responsibility for ordering, installing, operating and maintaining a lightwave system.

Rather than a global village, our contention is that all societies will be inundated with multifarious information systems. This will be especially true for the family unit which is the focus of this study. Evidence of this already exist. In what follows, we present a model based on ten information systems which are simultaneously functioning in many post-industrial societies at the present time, and which, we believe, will be the dominant systems available to the family unit during the next two to three decades. Such a model should facilitate research on new communication technology during the interim period.

Level One Information System

The average American family in the early 1980's owns the following instruments for gathering and using information: a clock, a thermometer, a radio, a telephone, a television set and a subscription to one newspaper and several magazines. We have refered to this as a level one information system

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[33] Robert LaBlanc, "The Future of Communications: The Invitation of the Eighties and Nineties," paper presented before the Illinois Telephone Association, 23 June 1980, Lincolnshire, Illinois, p.8.

[34] Their new LED system, which uses light-emitting diodes is claimed to be superior to present fiber optics since fewer signal repeaters, or amplifiers, are needed due to less light loss and dispersion.

although there are families who are not even at this level. If our study were historical we could go back to 1940 thereby eliminating television or we could go as far back as the turn of the century and eliminate radio. Our focus here, however, is on the sociology of information systems in the present and future.

Level Two Information System

The increased information available in a level two information system modifies the sociology of the family unit to a minor degree. By 1979, approximately 14.1 million American families (20% of the American homes) had augmented their information system by subscribing to one of 4,150 cable systems.[35] The average cable company operating in 1975 had a capacity of twenty channels, while newer systems offer far greater capacity. In Atlanta, Georgia, 54 channels are offered in cable and a system in Portland, Oregon, will begin by offering 80 channels with plans to expand this to 108 channels.[36]

Satellite transmission is also included at level two since it provides similar information services at the present time.[37]

Level Three Information System

Level Three is characterized by 'pay-cable.' In 1978, 13 million families were connected to a cable system while only slightly more than 2 million were subscribers to pay-cable. This number will no doubt increase rapidly in the years ahead. The significance of pay cable lies in the diversity of additional information in the form of entertainment, more specifically sports, music and movies. Subscribers to pay cable receive anywhere from 20 additional films to over 100. Many of these are adult films (some x-rated) and others are foreign films.

Level Four Information System

The coupling of video discs or video recorders to the home television set would move the family system to level four. Video discs will allow families to preserve information as they build libraries of discs.

Video tape recorders allow users to play pre-programmed magnetic-tape cassettes or to record over-the-air programs. This program may then be played back at a later, more convenient, time. The result of both systems is that the family unit has a temporal control over the use of information and an opportunity to 'import' into the home entertainment and educational material not

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[35] Television Factbook, Part b: Service Volume, 1979 ed., No. 48, (Washington, D.C.: Television Digest, Inc., 1979), p. 83-a.

[36] Martin Mayer, "For Commercial TV, Either a New Beginning or the End," Next (Jan-Feb 1981), p. 34.

[37] We are not referring here to direct satellite but to subscription satellite systems which enable viewers to receive additional channels consisting primarily of movies.

available to the majority.

Level Five Information System

A Level Five Information System comes with the availability of teletext and videotext and possession of the necessary hardware in the home to access these software packages. Teletext is an over-the-air system. Signals carrying graphic and alphanumeric material are sent over the air to the home receiver set along with the normal television picture. These signals are carried on 'unused' picture lines and are displayed on the television screen only after passing through a special decoder.

Teletext was first developed in England by the British Broadcast Corporation (BBC) in 1972 and called 'Ceefax'. A second system, called 'ORACLE' was later introduced by Independent Broadcasting Authorities.[38]

The first major-market program test of teletext in the United States was announced by CBS's Gene Mater, who boldly predicted: "Teletext is the future and there is no way to avoid it. We want to be involved in shaping that future.[39] The system will begin in April 1980 at the CBS-owned and operated station KNXT(TV) and a noncommercial station KCET(TV), both in Los Angeles.[40] Information services being considered by CBS include news, sports, weather, traffic congestion, travel timetables, games, advertisements, entertainment guides, emergency services and children's educational exercises.[41]

Currently, there are two important videotext systems on trial; Prestel, a system operated by the British Post office in England, and Viewtron, a system operated by Viewdata Corporation of America, Inc.[42] and the American Telephone and Telegraph Company. Both systems operate over regular telephone transmission wires.

The Prestel system provides over 150,000 pages of data on a wide range of topics including stock market quotations, airline schedules, library references, crop and weather, and so forth. Users of the Prestel system rent a specially adapted television set and access the system through their telephone. They are charged for telephone and computer time.[43] In one sense, the

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[38] Timothy J. Logue, "Teletext: Towards an Information Utility?" Journal of Communication, 29, No. 4 (Autumn 1979), pp.58-65.

[39] "CBS Going Live....," p. 21.

[40] Teletext systems are already being tested in England (Ceefax and Oracle) and France (Antiope). CBS experimented with each of these systems and has chosen to use a modified version of the French Antiope system.

[41] "CBS Going Live...," p.21.

[42] Viewdata Corporation is a subsidiary of Knight-Ridder Newspapers.

[43] Susan Spaeth Cherry, "Telereference: The New TV Information Systems," American Libraries, (Feb 1980), pp. 94-98, 108-110.

Viewtron system, in Coral Gables, Florida, is more "advanced" than Prestel in that it offers transactional services such as in-home banking, airline reservation services, and purchasing orders for department store, book and sporting good store merchandise.[44] However, the 150,000 pages of information offered by the Prestel system is vastly greater than Viewtron's 15,000 pages, which is more similar to an encyclopedia. In addition, the Prestel system can be accessed by anyone with a telephone and a teletext-equipped television. Viewtron services are available 18 hours per day 7 days a week (6 a.m. to midnight).

Level Six Information System

The basic component of a level six information system is the 'interactive cable.' Several two-way cable systems have already been piloted in the United States and in other countries such as Canada, Japan and England. Level six information systems might be similar to Manitoba's Telephone System,[45] Project Ida. Project Ida incorporates the information services of videotext with other services such as computer-aided educational instruction under the direction of the Manitoba Department of Education. Services include automatic metering of hydro and natural gas, entertainment, such as TV games and closed-circuit TV, and protection services, such as ambulance alert and stored medical information, fire alarm with data print-out, and intrusion alarms. Eventually the system will include such services as electronic mail, shopping from home, and library referencing.

Level Seven Information System

Subscription to an even more advanced interactive cable system, such as Qube in Columbus, Ohio, would move the family unit into a level seven information system. Level seven is characterized as systems which offer limited 2-way communication with the head-end of the system. The QUBE system, with 30 available channels, offers the videotext, educational programs, protection, banking, etc. offered by Ida and the banking offered by Viewtron but adds the entertainment potentials of regular broadcasting, pay TV, HBO via satellite, and cable. Through satellite relay, and a programmed library, QUBE offers the family a choice of over 400 movies a week. Of paramount significance is the potential for response and opinion polling. The keypad used by the viewer, in conjunction with his regular television set, telephone, and adapter, is a small limited-capacity computer terminal/selector console which has thirty channel selection buttons and five response buttons.[46] Through the response buttons the viewer can request various services, answer multiple-choice and yes/no questions posed to him from the cable communication center, and request further information. The potential of such response facilities are unlimited

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[44] "Viewtron Test Started by Knight-Ridder," Editor & Publisher (1980), pp. 18-19; Viewdata Corporation news releases.

[45] Manitoba Telephone System, Exploring the Wired City, (Manitoba, Canada: Manitoba Telephone System, n.d.)

[46] The new QUBE III console introduced May 18, 1980 has 110 program channel capacity and twelve interactive response buttons.

for community interaction.[47]

Level Eight Information System

An interactive cable system more sophisticated than QUBE has been underway since July, 1978, in Higashi Ikoma, Nara Prefecture, Japan. The experiment is called Hi-OVIS. ("Highly-Interactive Optical Visual Information System") and was developed by the Visual Information System Development Association in Japan.[48]

Like QUBE and Project Ida, Hi-Ovis uses a television receiver and a keypad but to this is added a black-and-white video camera, and a microphone.[49] The viewer is able to respond either through pressing buttons on the keypad or speaking directly over the microphone and camera. Thus Hi-Ovis is a two-way visual and verbal communication system as well as an information system.

Hi-Ovis offers information services through videotape, microfiche and other storage and retrieval media, but the real advance of the system is its emphasis on user participation. There are several areas in which the user may participate: (a) by tuning in to local programs and joining the on-going discussion via the home microphone/camera or keypad, (b) serving as "host" to a local program, (c) producing programs from one's home, and (d) participating in locally originated programs produced via the mobile relay services.

Level Nine Information System

Perhaps the most profound change in communication patterns will be seen at level nine when the family information system is connected to a computer conference network. At level nine the family unit is able to communicate not only with the head end of the system but to anyone else subscribing to the computer system.[50]

Computer conferencing requires the family to have a terminal, either hardcopy or CRT (cathode ray tube), and a phone link to the main computer. The computer is used to structure, store, and process written communications exchanged between conference members. A member of the family enters a message

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[47] At present the generation of the questions occurs at the control center only, thereby limiting the viewer's participation. But we can expect the interactive potentials of the system to undergo further development.

[48] Visual Information System Development Association, Hi-OVIS Project: Hardware/Software Experiments, July 1978-March 1979, Interim Report (Tokyo, Japan: Visual Information System Development Association [VISDA]-MITI Juridical Foundation, 1979.)

[49] Hi-Ovis uses optical fibers rather than coaxial cable or telephone links. Optical fibers can carry a far greater number of signals than either of the other two.

[50] Communication here, of course, would not be visual in the way that Hi-Ovis allows viewers to see each other.

through one terminal. Messages are stored at a central computer. The recipient may then access that message immediately through his terminal or wait until later to call up the conference file which contains a record of the open conference discussion as well as private messages routed to that specific participant. The user dials a code to be linked into the computer-host of the conferencing system. He then types code words to identify himself. At this point he receives the conference file. The user may access the new messages, review old materials still in the memory, or enter any on-going discussions by groups to which he belongs.[51]

Computer conferencing allows the participation of geographically dispersed individuals, removes many of the size limits to groups without diminishing participation of individuals, allows bringing into the discussion materials which are stored in other computer data banks, allows exchange of private messages without others being aware of it, and much more.[52]

As the market for personal computers (such as those distributed by Apple and Radio Shack) grows, the use of computer conferencing will increase. Anyone who owns a personal computer simply needs to buy an inexpensive accessory and find other individuals with personal computers in order to set up a computer conference. Present trends indicate interactive cable systems, e.g. Qube, might lead the way in computer conferencing. Subscribers to Qube who own a home computer, can presently participate in computer conferencing with others who are comparably equipped. While Qube subscribers are not the only individuals with this capability they might be more likely than others to begin a small network at the encouragement of Qube. Xerox's new Internet system and IBM's 6670 Information Distributor are just two other systems which allow users to send words electronically from one terminal to another. Since the cost of the Xerox and IBM systems are prohibitive they may not be introduced to the home market for some time.[53] Very likely, though, the increasing use of the Xerox and IBM computer conferencing systems in the office will accelerate their eventual use at home. At the present time few individuals are accustomed to communicating via computers except to transfer data.

Level Ten Information System

Level ten will exist when a family possesses a complex system consisting of highly-interactive cable, pay-tv, direct satellite, and multi-channel reception, cassette recorder, a personal computer, and a computer-conferencing hook-up to outside data banks. Urbane families in this category may very well design their homes with this sophisticated information system in mind. It is important to note that a level ten system is presently available to anyone with interactive cable who can afford it. Further, interactive cable will soon be available in Cincinnati, Houston, and Pittsburgh.

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[51] Hiltz and Turoff, pp. 7-8; Baer, pp. 61-123.

[52] Hiltz and Turoff, pp. 9-10

[53] Systems such as IBM's 6670 use high quality laser printing and incorporates many other customized services which raises the cost far above a Radio Shack Model III and printer.

Families with level ten information systems will tap data banks for an infinite source of information. The demand for data bank hook-ups are already making themselves evident in small ways. As Walter Baer points out:

> Most hobbyists soon run out of pure computing tasks and turn their attention toward exchanging programs and messages, using data bases, and playing games with other hobbyists....Like professionals who work at home, hobbyists will want their own home communications terminals.[54]

Electronic mail will be the accepted norm in families operating at level ten.[55] Such electronic message services can already be used with the QUBE interactive cable system and for communication between owners of home computers. Computer terminals are not widespread enough to provide an effective national network at present.

In summary, our limited purpose in this paper was to argue against the notion of a wired world within the next 25-30 years. We propose, instead, ten levels of information systems which could serve as a model for research on social effects of new communication technology. With some degree of variance, this model represents the type of systems which will be functioning at the level of the family unit in the next two to three decades. It can thus be assumed that any post-industrial society could be divided into socio-economic groups consisting of families according to most of these levels, while preindustrial societies may only be able to accomodate the lowest level.[56]

An example of information inequity can already be provided. Television viewers in Columbus, Ohio have access to over 400 movies per week, interactive cable, home protection and a myried of other advanced capabilities due to the Qube system. Paradoxically, television viewers twenty miles away are fortunate if they are able to receive programs from three networks and one independent station. In other words, information equity no longer exists in the U.S. At the present time, the wealthiest Texan is information poor when compared to citizens of Columbus, Ohio. McLuhan hinted at such a phenomenon when he observed that, "Electric speed mingles the cultures of prehistory with the dregs of industrial marketeers, the nonliterate with the semi- literate."[57]

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[54] Baer, p. 90.

[55] In general, we agree with the National Research Council report that electronic message service is not enough in itself to prompt the purchase of home terminals. However, as home terminals are acquired for other purposes the cost of the additional 'electronic mail' service comes within range. "Electronic Message Systems for the U.S. Postal Service," (Washington, D.C.: National Research Council, 1976) as referenced in Henry Geller and Stuart Brotman, "Electronic Alternatives to Postal Service," in Communications for Tomorrow: Policy Perspectives for the 1980s, ed. Glen O. Robinson (New York: Praeger Publishers, 1978), pp. 337-338.

[56] There will, of course, be families which have no electronic information system whatsoever. Numerous Asian and African nations, for example, do not yet have TV stations or daily newspapers.

This, rather than the notion of a global village, more closely resembles what is in store for societies as each family acquires information systems according to availability, cultural judgement and discretionary income.

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[17] Marshall McLuhan, "The Medium is the Message," in Mass Media and Society, ed. Alan Wells (Palo Alto, CA: National Press Books, 1972), p. 311.